Citation:

Johnson KJ, Anderson KE, Harnack L, Hong CP, Folsom AR. No association between dietary glycemic index or load and pancreatic cancer incidence in postmenopausal women. *Cancer Epidemiol Biomarkers Prev* 2005;14(5):1574-1575.

PubMed ID: 15941976

Study Design:

Prospective Cohort Study

Class:

B - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To examine the hypothesis that high dietary glycemic index and glycemic load are associated with increased risk of pancreatic cancer.

Inclusion Criteria:

- Iowa Women's Health Study
- Women ages 55-69 years old at baseline in 1986 from the 1985 driver's license list
- Responded to a mailed questionaire and completed baseline information and a 126-item food frequency questionnaire

Exclusion Criteria:

- Those who had implausible energy intake (> 5000 calories/day or < 600 calories/day)
- Those who had ≥ 30 missing responses on the food frequency questionnaire
- Those who reported previous cancer (except nonmelanotic skin cancer)
- Those who were postmenopausal

Description of Study Protocol:

Recruitment: Iowa Women's Health Study participants. Women ages 55-69 years old at baseline in 1986 from the 1985 driver's license list responded to a mailed questionaire and completed baseline information and a 126-item food frequency questionnaire.

Design: Prospective Cohort Study

Blinding used (if applicable): not applicable

Intervention (if applicable): not applicable

Statistical Analysis:

- Poisson regression was used to calculate crude incidence rates for potential independent risk factors.
- Cox proportional hazards regression was used to calculate unadjusted and adjusted hazard ratios (HR) and 95% confidence intervals according to the average daily GI or GI.
- Adjustments were made for age, smoking status, pack-years, diabetes, and multivitamin use.
- Tests for interaction on the multiplicative scale were done using the liklihood ratio χ^2 test.

Data Collection Summary:

Timing of Measurements:

- Baseline information and a food frequency questionnaire was obtained as part of the Iowa Women's Health study, collected in 1986
- Baseline information included education, physical activity, individual and family medical history, anthropometric variables, diet, multivitamin use, and smoking history.
- Subjects were followed through the administration of four follow-up questionnaires (1987, 1989, 1992, and 1997).

Dependent Variables

- Incidence of pancreatic cancer as measured by Iowa death records, the National Death Index, and the Iowa Cancer Registry

Independent Variables

- Glycemic index as calculated using the following formula:

{Σ[(Servings of food/day) x (carbohydrate content of food) x (glycemic index)]} /Total carbohydrate in diet

- Glycemic load as calculated using the following formula:

Σ[(servings of food per day) x (carbohydrate content of food) x (glycemic index)]

Control Variables

- Age
- Smoking status
- Pack-years
- Diabetes status
- Multivitamin use

Description of Actual Data Sample:

Initial N: 41,836 women were enrolled in the Iowa Health Study

Attrition (final N): 33, 551 women's records were used for the data analysis for this study

Age: 55 to 69 years old at baseline in 1986

Ethnicity: No information was provided

Other relevant demographics: No other demographic information was provided

Anthropometrics: Height, weight, and BMI were obtained on all participants

Location: Iowa

Summary of Results:

Incidence of pancreatic cancer was higher in those who were 65 to 69 versus 55 to 64 years of age, diabetic versus non-diabetic, current smokers versus nonsmokers, and multivitamin non users versus users.

There was no association between pancreatic cancer incidence and body mass index, physical activity, or any dietary variables including fruits and vegetables, meat, fat, carbohydrates, fiber, coffee, energy intake, and alcohol.

There was no increased hazard of pancreatic cancer associated with high dietary glycemic index or glycemic load.

Hazard Ratios of Pancreatic cancer by Average Daily Glycemic Index or Glycemic Load quartile in the Iowa Women's Health Study

	Average Daily GI <82	Average Daily GI 82-85	Average Daily GI 85-89	Average Daily GI >89
Unadjusted model case numbers	54	38	38	60
Unadjusted HR	1.0 (reference	0.69	0.69	1.1
95% CI		0.45-1.04	0.46-1.04	0.76-1.59
P trend				0.63
	Average Daily GL <151	Average Daily GL 151-169	Average Daily GL 170-188	Average Daily GL >188
Unadjusted Model case number	50	54	45	41
Unadjusted HR	1.0 (reference)	1.06	0.89	0.81
95% CI		0.72-1.56	0.59-1.33	0.54-1.23
P trend				0.23
Adjusted model case numbers	47	51	44	39
Multivariate-adjusted HR*	1.0 (reference)	1.06	0.89	0.81
95% CI		0.73-1.62	0.63-1.45	0.56-1.34

P trend	0.43

*Adjusted for baseline age, smoking, and pack-years, diabetes, and multivitamin use

Author Conclusion:

The authors did not find evidence to support the hypothesis that high dietary glycemic index or glycemic load increases the risk of pancreatic cancer.

Reviewer Comments:

Many details of the Iowa Women's Health Study were not outlined in this paper, including how diabetes status was determined, a description of the baseline questionnaire and food frequency questionnaire. Authors note the following limitations:

- *Use of a single questionnaire to collect dietary information*
- *Moderate number of case subjects*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions		
1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions		
1.	**Was the research question clearly stated?**	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	Yes
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	Yes
1.3.	Were the target population and setting specified?	Yes

2.	**Was the selection of study subjects/patients free from bias?**	Yes
2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	Yes
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	**Were study groups comparable?**	Yes
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	Yes
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	**Was method of handling withdrawals described?**	Yes
4.1.	Were follow-up methods described and the same for all groups?	Yes
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	Yes
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	Yes
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	**Was blinding used to prevent introduction of bias?**	N/A

5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	N/A
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	**Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were interveningfactors described?**	Yes
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	Yes
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	Yes
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	**Were outcomes clearly defined and the measurements valid and reliable?**	No
7.1.	Were primary and secondary endpoints described and relevant to the question?	No
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	Yes
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	???
7.6.	Were other factors accounted for (measured) that could affect outcomes?	Yes

	7.7.	Were the measurements conducted consistently across groups?	N/A
8.	**Was the statistical analysis appropriate for the study design and type of outcome indicators?**		Yes
	8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
	8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
	8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
	8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
	8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	Yes
	8.6.	Was clinical significance as well as statistical significance reported?	Yes
	8.7.	If negative findings, was a power calculation reported to address type 2 error?	N/A
9.	**Are conclusions supported by results with biases and limitations taken into consideration?**		Yes
	9.1.	Is there a discussion of findings?	Yes
	9.2.	Are biases and study limitations identified and discussed?	Yes
10.	**Is bias due to study's funding or sponsorship unlikely?**		Yes
	10.1.	Were sources of funding and investigators' affiliations described?	Yes
	10.2.	Was the study free from apparent conflict of interest?	Yes